Mrs. Graf

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Engineering
S. H. McCrory, Chief

SUPPLEMENTARY BIBLIOGRAPHY RELATING TO THE DELETERIOUS ACTION OF SOIL ALKALIES AND OTHER CHEMICAL AGENTS ON CEMENT AND CONCRETE

1931

(For publications issued prior to 1924 see Department Bulletin 1314)

Anonymous

The effect of sugar on concrete. Concrete 29: No. 5. 30. 1926.
Brief note regarding failure of concrete due to sugar in the cement.

Dense concrete used on Chicago aquarium. American Contractor 49: No. 29, 18-19, illus. 1928.
Tanks are considered impervious to corrosive action of sea or fresh water.

Effects of salts in mixing water on compressive strength of mortar. Public Roads 8: 248-249.
Gives results of investigation at University of Texas.

Effect on cement of certain salts in mixing water. Public Works 59: 74. 1928.
Shows that all sodium salts are injurious, magnesium salts have only slight effect, calcium chloride and ferrous sulphate are beneficial.

The corrosive attack of moorland water on concrete. (Discussion) Surveyor 74: 571-573. 1928.
Discusses treatment with silicate of soda, treatment of the water maintenance of smooth skin surface.

Tests on concrete piles in sea water undertaken by Navy. Enginering News-Record 97: 372, 373, illus. 1926.
Abstract of report by R. M. Warfield to Chief of Bureau of Yards and Docks.

Comparative tests on concrete piles in sea water. Engineering News Record 96: 732-736, illus. 1926.
Abstract of report by Geo. F. Nicholson of the Los Angeles Harbor Board.

Concrete in sea water. Concrete 25: 226-227. 1924.
Results of tests of specimens of concrete in St. John's Harbor, Canada.

Behavior of cement mortar and concrete in German bogs. Concrete: 24: 207-208, 1924.
Summary of report of special subcommittee of German Committee on reinforced concrete.

Tests on concrete piles in sea water undertaken by Navy. Engineering News-Record 97: 372-373, illus. 1926.
Describes methods of making and suspending test piles under pier.

Comparative tests on concrete piles in sea water. Engineering News-Record 96: 732-736, illus. 1926.
Contains results of studies by Los Angeles Harbor Board on four types of piles.

Aladjem, R.

Seasonal variation in salinity of water of some drains of the first circle of irrigation. Egypt Min. Agr. Tech. and Sci. Serv. Bul. 66: 4 p., illus. 1926.
Gives results of chemical analyses of drainage waters from irrigated soils.

American Society for Testing Materials.

Effect of oils and miscellaneous liquids on concrete and method of protective treatment where required. Amer. Soc. Testing Materials 24, Pt. I: 381-383. 1924.
Part of report of Joint Committee on specifications for concrete.

Anderegg, F. O.

The mechanism of corrosion of Portland cement concrete with special reference to the role of crystal pressure. Amer. Concrete Inst. Proc. 25: 332-343, illus. 1929.
Treats of action of sulphate, strength determination, effect of temperature drop, etc.

Anderson, E.

Determination of water imperviousness of water permeability of cements. Concrete 26: 195-197, illus. 1925.
Gives results of laboratory tests.

Relation between water permeability and water absorption of concrete. Indus. and Engin. Chem. 18: 17-18, illus. 1926.
Tests are described and results stated.

Badder, H. C.

Impervious concrete. 204 p. illus. London. 1923.
Relates chiefly to selection of aggregates, mixing, depositing, finishing surface, etc., in order to secure impervious concrete.

Bates, P. H.

The use of sulphur in rendering cement drain tile resistant to the attack of alkali. Indus. and Engin. Chem. 18: 309-310. 1926.
Gives results of studies at the U. S. Bureau of Standards.

High-alumina hydraulic cements. Indus. and Engin. Chem. 18: 554-559, illus. 1926.
A contribution from the U. S. Bureau of Standards. This cement has high resistance to sulfate-bearing waters.

Baylis, J. R.

Relation between the characteristics of Portland cement and deterioration of concrete. Concrete 31: No. 4, 39-42, illus. 1927.
Causes of disintegration discussed.

Corrosion of concrete. Amer. Soc. Civ. Engin. Trans. 90: 791-866, illus. 1927.
Treats of surface absorption, hydration, structural formation of mortars, porosity, proportioning aggregates. Discussion p. 822-866.

Breazeole, J. F.

A study of the taxicity of salines that occur in black alkali soils. Ariz. Agr. Expt. Sta. Tech. Bul. 14: 337-357, illus. 1927.
Gives results of solution culture and pot culture experiments.

Broazeole, J. F. and McGeorge, W. T.
Sodium hydroxide rather than sodium carbonate the source of alkalinity in black alkali soils. Ariz. Agr. Expt. Sta. Tech. Bul. 13: 307-335, illus. 1926.

Buelow, von

Betonzerstoerung durch aggressive Waesser und ihre Bakaempfung im Arbeitsgebiet der Em - schergenossenschaft. Bautenschutz (Berlin) 1: 113-118, illus. 1930.
Observations on disintegration of concrete linings of sewers tunnels and canals carrying industrial wastes.

Burgess, P. S.

Alkali soil studies and methods of reclamation. Ariz. Agr. Expt. Sta. Bul. 123: 157-181, illus. 1928.

Burke, E. and Pinckney, R. M.

Alkali soils in Montana. Mont. Agr. Expt. Sta. Bul. 172: 20p., illus. 1925.
Contains data on location, origin, extent and composition.

Burke, G. W.

Relation of chemical test methods and sulphate resistance of different brands of Portland cement. Rock Products 32: 79-80.
Brief discussion. Bibliography.

The chemical action of alkali on hydraulic cements. Iowa Engin. Expt. Sta. Bul. 74: 55 p., illus. 1925.
Reports the results of studies of the action of magnesium salts on Portland cement.

Castro, E. de

Cementos sumergidos en el mar. Revista de Obras Publicas No. 5: 82-83. 1928.
Gives results of a study of cements for maritime works.

Catlin, C. N. and Vinson, A. E.

Treatment of black alkali with gypsum. Ariz. Agr. Expt. Sta. Bul. 102: 289-337, illus, 1925.
Studies of effectiveness of gypsum neutralizing alkali in soils are described.

Clair, M. N.

Effect of sugar on concrete in large-scale trial. Engin. News-Rec. 102: 473. 1929.

Cooke, W. T.

An occurrence of deterioration in a sample of concrete. Jour. Soc. Chem. Indus. 42: 433-434. 1923.
Gives results of analyses of samples of concrete immersed in sea water 4 1/2 years.

Crum, R. W.

Field inspection of concrete pipe culverts. Iowa Agr. Col. Official Pub. 29: 32p., illus. 1930.
Record covering 22 years includes notes on effects of various natural agents upon life of pipe.

Dumolard, P.

Action de l'eau pure sur des differents liants hydrauliques Revue des Materiaux de Construction et de Travaux Publics No. 224: 165-166.
Disintegration of conduit led to investigation to determine whether pure water has detrimental effects on all cements.

Ekwall, A.

Deterioration of concrete in hydraulic structures. Concrete 35: No. 4, 21-22. 1929.
Preliminary report by Swedish Royal Board of Waterfalls.

Fertig, G. J.

Sea-water resistant cements. Concrete 35: 105-110, illus. 1928.
Discussion of chemical factors which render Portland cement and concrete resistant to sea water.

Forchhammer, H.

Reinforced concrete in sea water. Concrete 25: 62. 1924.
Excerpt from paper presented to International Cement Congress. April 22, 1924.

Geszner, H.

The cause of concrete destruction in improved soils. Reprint from collection of reports of first adult instruction course conference of Swiss civil engineers. April, 1926.

Grover, O. L.

The deterioration of concrete in sea and alkali water. Concrete 27: No. 4, 17-18. 1925.
Excerpt from article in American Highways.

Grün, R.

Injurious influences on concrete and their prevention. Concrete 29: No. 5, 43-44. 1926.
Effects of various materials and remedies, as shown by investigations in Germany.

The destruction of fresh concrete through salt bearing water. From reprint, Der Bauingenieur, 7th set. Pt. 10. 1926.

Zerstörung von beton in aggressiven wässern. Chemische Fabrik 1: 281-283, 294-295, illus. 1928.

Chemical resistance of cements. Pit an Quarry 15: 68-70. 1928.
Gives results of experiments to determine behavior of ordinary cement mixed with blast-furnace cement and resistance to salts and acids.

Fluessigkeiten als Beton-zerstoerer und die Moeglichkeiten des Betonschutzes. Korrosion u. Metallschutz 5: 73-84, illus. 1929.
Deterioration of concrete by water and means of prevention are discussed.

Halcrow, W. F., Brook, G. B., and Preston, R.

The corrosive attack of moorland water on concrete. Water and Water Engin. 30: 579-586. 1928.
Describes particular instances of deterioration due to contact with moorland water, acidity of water, best materials for resisting action of water; protective coatings.

Haynes, J. D.

Studies with sulfur for improving permeability of alkali soil. Soil Sci. 25: 443-446. 1928.
A report of experiments at the Oregon Experiment Station of experiments on black alkali soil.

Hibbard, P. L.

Experiments on the reclamation of alkali soils by leaching with water and gypsum. Calif. Agr. Expt. Sta. Tech. Paper 9: 14p. 1923.
Studies are reported on leaching in 5-foot columns of 5 different alkali soils.

Alkali soils - origin, examination, and management. Calif., Agr. Expt. Sta. Circ. 292: 14 p. 1925.

Idaho Agricultural Experiment Station.

(Studies of alkali soils) Idaho Agr. Expt. Sta. Bul. 149: 12-13. 1927.
Discusses the effectiveness of drainage and the use of chemicals such as gypsum and alum.

Jennings, D. F.

Concrete resists sulphate action. Concrete 33: No. 1, 43-44, illus. 1928.
Inspection of 10 year old reinforced concrete shows no deleterious effect.

Joffe, J. S. and McLean, H. C.

Alkali soil investigations II Origin of alkali soils; physical effects of treatments. Soil Sci. 18: 13-20, illus. 1924.
Gives further results of experiments at New Jersey. Experiment Station.

Alkali soil investigations, III, IV. Soil Sci. 18: 133-149, 237-253, illus. 1924.
Gives results of experiments to determine the chemical and biological effects of treatment.

Johnston, W. W. and Powers, W. L.
A progress report of alkali land reclamation investigations in eastern Oregon. Ore. Agr. Expt. Sta. Bul. 210: 4-27, illus. 1924.
Gives results of tank and field experiments.

Joseph, A. F. and Oakley, H. B.

The properties of heavy alkaline soils containing different exchangeable bases. Jour. Agr. Sci. (England) 19: 121-131, illus. 1929.
Reports the results of experiments with soils saturated with different bases.

Kelley, W. P.

A general discussion of the chemical and physical properties of alkali soils. First International Congress Soil Science 4: 483-489, 1928.

Kelley, W. P. and Arany, A.

The chemical effect of gypsum, sulfur, iron sulfate, and alum on alkali soil. Hilgardia (Calif. Sta.) 3: 393-420. 1928.

Kelley, W. P. and Thomas, E. E.

Reclamation of the Fresno type of black alkali soil. Calif. Agr. Expt. Sta. Bul. 455: 37 p. illus. 1928.
Gives results of field experiments using gypsum, sulfur, iron sulfate, and alum.

Kobbe, W. N.

Strengthening and indurating concrete with sulphur. Engin. News-Record 96: 940-942, illus. 1926.
Gives results of tests extending over a number of years.

Lagaard, M. B.

Integral waterproofing compounds for concrete. Minn. Univ. Engin. Expt. Sta. Bul. 6: 25 p., illus. 1927.
Gives results of tests of 12 commercial waterproofing compounds and 2 waterproof cements.

Leonard, J. A.

Concrete seawater pier protected by granite blocks in alumina cement. Engin. News-Rec. 96: 956, illus. 1926.

Lord, E. C. E.

Protection of concrete against alkali. U. S. Dept. Agr. Public Roads 6: 105-112, 119. 1927.

Protection of concrete against alkali. Public Roads 8: 105-112, 119, illus. 1927.
Further tests by Bureau of Public Roads reported.

Mackenzie, C. J.

Some recent studies in effect of alkali on concrete. Engin. News-Rec. 95: 920-921. 1925.
Abstract of paper published in Engineering Journal giving brief resume of results of three years' experiments.

The condition of field specimens of concrete exposed to alkaline soils and water examined in December, 1927. Appendix B. Report of committee on deterioration of concrete in alkali soils to Council of the Engineering Institute of Canada.

———————

Concrete exposed to alkali ground waters. Amer. Concrete Inst. 25: 763-767. 1929.
Points out how concrete can be made immune to alkali.

Mackenzie, C. J. and Thorvaldson, T. T.

Differentiation of the action of acids, alkali waters, and frost on normal Portland cement concrete. Engin. Jour. (Canada) 9: 79-84, illus. 1926.
Describes a case of concrete disintegration caused by alkali water, acid and frost.

Maynard, E.

Mecanisme de l'action des eaux de diverses natures sur les mortiers et le beton arme. Genie Civil 91: 162-164. 1927.
A review of recent French observations and studies.

Miller, D. G.

General results of concrete-alkali investigation in Minnesota and instructions relative to submission of samples for tests and analyses. Dept. of Drainage and Waters, State of Minn. 12 p. 1921.

———————

Summary of the results of the concrete-alkali investigations in southwestern Minnesota and northern Iowa. Seasons of 1919 and 1920. Minn. Dept. of Drainage and Waters. 7 p. 1921.
Brief statement prepared for legislature.

———————

Alumina cements and sulphate water. Concrete 28: 29-31. 1926.
Reports results of experiments at Minnesota Agricultural Experiment Station.

———————

Volume change a measure of alkali action. U. S. Dept. Agr. Public Roads 5: 12, 13, 17, illus. 1924.
Report of tests at University of Minnesota of effects of alkali as indicated by changes in length of text specimen.

———————

The action of sulphate water on concrete. U. S. Dept. Agr. Public Roads 6: 174-179, 183, illus. 1925.
Gives further results of tests of specimens of concrete immersed in Medicine Lake, S. Dak.

Miller, D. G. (Cont'd)

Laboratory investigations of the influence of curing conditions and various admixtures on the life of concrete stored in sulfate solutions as indicated by physical changes. Amer. Soc. Testing Materials. Proc. 24: Pt. 2, 847, 861, illus. 1924.
Contains results of test cylinders at University of Minnesota.

Curing conditions of concrete drain tile. Concrete 24: 235-238, illus. 1924.
Describes experiments with test cylinders in sulfate water.

Brief review of alkali action of Portland cement concrete. Proc. Highway Research Board, 6th Annual Meeting. 223-229. 1927.
Reviews the work of various organizations.

Portland cements and sulphate waters. Minn. Federation and Architectural and Engineering Societies. Bul. V13. No. 4. 11-17. 1928.

Resistance of Portland cement concrete to the action of sulphate waters as influenced by the cement. U. S.Dept. Agr. Public Roads 9: 82-87, illus. 1928.
Progress report of studies being conducted in cooperation with Minnesota Experiment Station.

Action of sulphate water on concrete. U. S. Dept. Agr. Public Roads 8: 203-213, illus. 1927.
Gives results of further tests on concrete immersed in Medicine Lake, S. Dak.

Four important factors in the manufacture of concrete pipe for alkali soils. Concrete 30: No. 5, 26-29, illus. 1927.
An outline of tests showing factors that lead to high and low resistance to concrete pipe.

Strength and resistance to sulfate waters of concrete cured in water vapor at temperatures between 100 and 350° F. Proc. Amer. Soc. Testing Materials 30: 636-653, illus. 1930.
Gives results of tests made at University of Minnesota.

Morrison, R. L. and Boyd, E. A.

Effect of sugar upon the tensile strength of Portland cement mortar. Concrete 32: No. 1, 26. 1928.
Gives results of tests in which small quantities of sugar was added to the mixture.

Nicholson, G. F.

Deterioration of concrete in sea water and preventive methods. Pacific Marine Rev. 24: 64-67, illus. 1927.
Causes of deterioration and preventive measures discussed.

Ostendorf.

Betonzerstoerung und ihre Abwehr. Bautechnik 7: 435-438, illus. 1929
Gives results of observations of massive hydraulic structures.

Powers, W. L.

Effects of sulfur and sulfates in alkali land reclamation. First ... Internat'l Cong. Soil Sci. 4: 442-445. 1928.

Proudley, C. E.

Effect of alkali on strength of mortar. Engin. & Contr. Roads and Streets, 61: 1205, 1206, illus. 1924.
A progress report of experiments by Bureau of Public Roads.

Effect of alkali on strength of mortar. Concrete 25: 12. 1924.
Gives results of tests of mortar briquets by Bureau of Public Roads.

Prussing, C.

Chemical resistance of cements. Rock Products 31: 96. 1928.
A comparison of Grun's tests of iron cement and blast-furnace slag mixture exposed to sodium sulphate with those at laboratory at Hemmoor.

Schlick, W. J.

The action of alkali salts on concrete drain tile. Iowa State Col. Engin. Expt. Sta. Bul. 89: 48 p., illus. 1928
Contains results of laboratory studies made in cooperation with the Bureau of Standards and others.

Sigmond, A. A. J. de'

Hungarian alkali soils and methods of their reclamation. Calif. Agr. Expt. Sta. Spec. Pub. 156 p., illus. 1927.
An English edition of a monograph originally published in 1923 by the Hungarian Academy of Sciences.

The classification of alkali and salty soils. First International Cong. Soil Sci. 1: 330-344. 1928.

The effect of calcium and aluminum salts in alkali soil reclamation. First International Cong. Soil Sci. 2: 512-517. 1928.

----Sondereggar, A. L.

The life of reinforced concrete piling in seawater. Western Constr. News 2: No. 18, 33-36, illus. 1927.
Examination of reinforced concrete piling in harbors of California.

Spofford, C. M.

Concrete piles resist action of sea water for five years. Engin. News-Rec. 92: 765. 1924.
Precast sheet piling of dense concrete apparently in first class condition.

Squire, H. E.

Thirty-five years of seawater exposed concrete. Engin. and Constr. 66: 477-479. 1927.
A historical sketch showing development of concrete construction on the San Francisco water front.

Concrete for resisting sea water. Amer. Concrete Inst. 25: 751-762. 1929.
Describes two ways in which sea water effects concrete and methods of prolonging life of marine concrete. Includes discussion.

Thomas, E. E.

The effect of sulfur, gypsum, and ferrous sulfate on alkali soil. First International Cong. Soil Sci. 4: 524-535. 1928.

Thorvaldson, T.

Notes on the relative resistance of various cements to the action of sulfate waters. Engin. Jour. 11: 180-184, illus. 1928.
Deals with natural resistance to sulphate action. Part of 1927 report to Council of Engineering Institute of Canada.

Thorvaldson, T. and Vigfusson, V. A.

Effect of steam treatment of Portland cement mortar on their resistance to sulphate action. Engin. Jour. 11: 174-179, illus. 1928.
States effect of curing in hot water on sulphate resistance; effect of steam treatment on tensile strength.

Thorvaldson, T., Harris, R. H., and Wolochow, D.

Disintegration of Portland cement in sulfate waters. Indus. and Engin. Chem. 17: 467-470, 1925.
Gives results of experiments of effects of sodium sulfate, magnesium sulfate and chlorides on cement.

The action of sulphates on the components of Portland cement. Trans. Royal Soc. Canada Third Serv. V. 21, sec. 3. 1927.

Thorvaldson, T., Lamour, R. K., and Vigfusson, V. A.

The expansion of Portland cement mortar bars during disintegration in sulphate solutions. Engin. Jour. (Canada) 10: 199-206, illus. 1927.
Gives results of studies at University of Saskatchewan.

Thorvaldson T., Solochow, D., and Vigfusson, V. A.

Studies on the action of sulphates on Portland cement, I - III. Canad. Jour. Research 1: 273-284; 359-384; 385-399, illus. 1929.
Part I treats of the expansion method in the study of action of sulphates, Part II discusses steam-curing as a remedy, and Part III the effect of the addition of silica gel.

Thorvaldson, T. and Shelton, G. R.

Steam curing of Portland cement mortars--a new crystalline substance. Canad. Jour. of Research 1: 148-154. 1929.

Tulaikov, N. M.

Alkali soils - their reclamation and utilizations. Mater. Rabot Opytn. Meliorat. Chaati Norod. Komis. Zeml. No. 16, 2 ed. rev. and enl. 236 p., illus. 1922.
Gives results of a study of results in the United States and Russia.

Upson, M. M. and McMillan, F. R.

Report of Committee E-6, on destructive agents and protective treatments. Amer. Concrete Inst. Proc. 22: 641-649, illus. 1926.
Gives results of observations and discusses use of sand for sea water structures.

U. S. Bureau of Standards, United States Government, master specifications for integral waterproofing material. (For use with Portland cement mortar on concrete) U. S. Bureau of Standards Circ. 360: 4 p. 1928.
Specifies materials to be mixed with concrete to render it impermeable.

Warren, A. E.

Reinforced concrete pipe tests. Canad. Engin. 51: 346. 1926.
Gives results of tests to develop pipe culverts which would not be affected by sea water.

White, A. H. and Bateman, J. H.

Soaps as integral waterproofing for concrete. Amer. Concrete Inst. Proc. 22: 535. 1926.
Contains results of tests showing practicability of using soap for this purpose.

Williams, G. M. and Furlong, I.

Durability of cement drain tile and concrete in alkali soils; Fourth progress report. (1923) Dept. Com. Bur. Standards Technol. Paper 307: 191-240, illus. 1926.
Reports the results of inspections made in 1923 at eight alkali-bearing projects.

Williams, G. M.

Disintegration of concrete. Amer. Concrete Inst. Jour. 1: 41-56. 1929.
Summary of available knowledge on nature of corrosion in concrete and preparation of concrete to resist action of alkali and sea water.

Withrow, R. E.

In defense of integral waterproofing. Concrete 35: No. 6, 27-30, illus. 1929.
Discussion of water repellant mixtures types of admixture, specifications, tests.

Wolf, E. F.

Effect on concrete of acid water from stored bituminous coal. Indus. and Engin. Chem. 21: 908-910, illus. 1929.
Gives results of observations at Baltimore.